

Remarks

Reconsideration of this Application is respectfully requested.

----- Upon entry of the foregoing amendment, claims 1 and 4-8 are pending in the application, with 1 being the independent claims. Claims 2 and 3 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claims 1, 4 and 6 have been amended. Amendments to claims 4 and 6 revise their claim dependencies. Support for the amendment to Claim 1 can be found throughout the application, *e.g.*, in cancelled claims 2 and 3, as well as in paragraph [0026]. Claims 7 and 8 have been withdrawn from consideration. These changes are believed to introduce no new matter, and their entry is respectfully requested.

----- Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Response to Restriction Requirement

Applicants thank the Examiner for our telephone conference of July 5, 2007, wherein Applicants provisionally elected Group 1, as claimed in claims 1-6, in response to the Restriction Requirement. This election is made without traverse. Claims 7 and 8 have been withdrawn herewith.

Rejections under 35 U.S.C. § 103(a) in view of Galasso et al. and Hanzawa et al.

Claims 1 and 5 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Galasso *et al.* (U.S. Pat. No. 4,425,407) in further view of Hanzawa *et al.* (U.S. Pub. No. 2001/0051258). Specifically, the Examiner alleged that Galasso teaches a method of making an oxidation protective coating for carbon/carbon composites [col. 2, ll. 56-58] comprising forming an initial coating layer [col. 2, ll. 67-68] by pack cementation [col. 2, ll. 64-67], and that further protective coatings may be applied [abstract]. The Examiner acknowledged that Galasso does not teach coating Si over the initial coating layer or heat-treating the Si-coated composite to form a SiC layer and a Si layer. However, the Examiner alleged that Hanzawa teaches formation of a Si-SiC material [0068, ll. 6-17]. Applicants respectfully traverse this rejection.

To establish a *prima facie* case of obviousness, the art cited by the Examiner must (1) teach all of the claim limitations; (2) provide a suggestion or motivation to those of ordinary skill in the art to make the claimed composition; and (3) reveal that one of ordinary skill would have a reasonable expectation of success in doing so. *See In re Vaeck*, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *see also* M.P.E.P. § 706.02(j). The United States Supreme Court, in *KSR International vs. Teleflex, Inc.*, 550 U.S. ___, WL 1237837 (April 30, 2007), further clarified the requirements for obviousness analysis under 35 U.S.C. § 103(a). The Court noted that the analysis supporting a rejection under 35 U.S.C. § 103(a) should be made **explicit**, and that it was "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. The Court specifically stated:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design

community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was ***an apparent reason*** to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, ***this analysis should be made explicit***. (KSR, slip opinion, page 14, citing *In Re Kahn*, 441 F. 3d 977,988 (CA, Fed. 2006) ([R]ejections on obviousness grounds ***cannot be sustained by mere conclusory*** statements, instead, there must be some articulated reasoning with some rational underpinning to support a legal conclusion of obviousness.").

Claim 1 of the present invention involves spraying a mixture of a vehicle liquid and Si powder on the carbon/carbon composite, heat-treating the Si-coated carbon/carbon composite to impregnate the initial coating layer and cracks in the initial coating layer with Si, thereby forming an SiC layer and an Si layer, and oxidizing the Si layer to form an SiO₂ film. Neither Galasso nor Hanzawa disclose a method comprising spraying a mixture of a vehicle liquid and Si powder on a carbon/carbon composite. Likewise, neither Galasso nor Hanzawa disclose a process that results in a bilayer coating having an SiC layer and an Si layer, and wherein the Si layer is oxidized to form an SiO₂ layer. Instead, Galasso discloses a composition having only a single layer, and merely refers to the possibility of the layer receiving "a subsequent protective coating." [Abstract] Nor does Galasso indicate what material should be used to subsequently form a protective coating, how a coating should be applied, or whether a coating should be a single layer or a bilayer. Furthermore, Hanzawa discloses coating "carbon/carbon composites," but does not disclose coating "carbon composites with an initial coating layer." Rather, Hanzawa discloses placing carbon/carbon composites in a "carbon crucible filled with Si powder." [0112]. The process of Hanzawa results in a composite material wherein "the content rate of silicon becomes higher according to the distance from the surface of the [composite] yarn." [0033]. Thus, the process of Hanzawa results

ion a composition having a *Si gradient, not a bilayer coat as is featured in claim 1.* Evidence for the bilayer coat of the present invention can be found in Figure 1. Thus, the product formed by the claimed method of making an oxidation protective multiple coating for a carbon/carbon composite is distinct from the method of Hanzawa.

Furthermore, even if, *arguendo*, the cited references disclose all the elements of the claimed invention, the Examiner has failed to establish that there would be an apparent reason to combine the references. The Examiner alleged that it would have been obvious to use Si to close the pores of the carbon/carbon composite since Hanzawa teaches that it is suitable for closing pores on carbon/carbon composites. However, in the present invention, Si is being used to coat a carbon/carbon composite *comprising an initial layer*. Thus, the Examiner has failed to provide motivation for coating a carbon/carbon composite comprising an initial layer.

Thus, neither Galasso, Hanzawa, or a combination of these references, provide or render obvious the method of the claimed invention. Claim 5 depends from claim 1. Therefore, claim 5 is also nonobvious over a combination of Galasso and Hanzawa. Upon consideration of the above, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) with respect to the Galasso in further view of Hanzawa be withdrawn.

Rejections under 35 U.S.C. § 103(a) in view of Galasso et al., Hanzawa et al. and Holko

Claims 3 and 4 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Galasso *et al.* (U.S. Pat. No. 4,425,407) and Hanzawa *et al.* (U.S. Pub. No. 2001/0051258) in further view of Holko (U.S. Pat. No. 5,021,107). Specifically, the

Examiner acknowledged that neither Galasso nor Hanzawa teach the use of a volatile carrier to apply the powder of the present invention. However, the Examiner alleged that Holko teaches the use of a volatile carrier.

----- Claim 3 has been cancelled. Claim 4 depends from claim 1. As described above, neither Galasso nor Hanzawa describe a process that results in a bilayer coat with an SiC layer and an Si layer, wherein the Si layer is oxidized to form an SiO₂ film as featured in claim 1. Likewise, Holko also does not teach a process that results in a bilayer coat having an SiC layer and an Si layer, wherein the Si layer is oxidized to form an SiO₂ layer. Thus, not even a combination of Galasso, Hanzawa and Holko discloses a method of making a composite as described in claim 1. Since each of the elements of claim 4 is not taught nor suggested by the cited documents, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) with respect to the Galasso, Hanzawa and Holko be withdrawn.

Rejections under 35 U.S.C. § 103(a) in view of Galasso et al., Hanzawa et al. and Rousseau

Claims 2 and 6 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Galasso *et al.* (U.S. Pat. No. 4,425,407) and Hanzawa *et al.* (U.S. Pub. No. 2001/0051258) in further view of Rousseau (U.S. Pat. No. 4,976,899). Specifically, the Examiner acknowledged Galasso and Hanzawa do not teach oxidizing the Si layer at a temperature of 400 °C to about 800 °C to form an SiO₂ film. However, the Examiner alleged that Rousseau teaches forming a protective SiO₂ coating on SiC coated carbon/carbon composite.

Claim 2 has been cancelled. Claim 6 depends from claim 1. As described above, neither Galasso nor Hanzawa describe a process that results in a bilayer coating having an SiC layer and an Si layer, as is featured in claim 1. Additionally, claim 1 features oxidizing the Si layer to form an SiO₂ film. Rousseau discloses "a silica coating (SiO₂) deposited on the surface and in the cracks of the SiC coating by vacuum impregnation in an alcoholic alkyl silicate solution and in particular ethyl polysilicate or ethyl orthosilicate." Col. 7, ll. 6-11. Thus, in Rousseau, the SiO₂ is deposited onto a Si/carbon matrix in a separate step. In claim 1 of the present invention, the Si layer *is oxidized to a SiO₂ layer*, rather than by the application of a separate SiO₂ layer. Thus, not even a combination of Galasso, Hanzawa and Holko discloses a method of making a composite as described in claim 1. Since each of the elements of claim 1, nor claim 6 which depends from claim 1, is not taught nor suggested by the cited documents, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) with respect to the Galasso, Hanzawa and Holko be withdrawn.

Double Patenting

The Examiner has provisionally rejected claims 1-6 on the ground of nonstatutory obviousness-type double patenting over claims 1-6 of copending U.S. Appl. No. 10/767,858. Claims 2 and 3 have been cancelled. Applicants respectfully traverse these rejections for nonstatutory obviousness-type double patenting, but nevertheless request that they be held in abeyance until the remaining issues outstanding in this application have been resolved.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Scott M. Woodhouse
Agent for Applicants
Registration No. 54,747

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1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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